



Contribution ID: 19

Type: **not specified**

## CP-odd observables in $B \rightarrow P l l$

*Wednesday 19 June 2024 10:00 (20 minutes)*

We consider the combined measurements of CP-averaged decay rates and direct CP asymmetries of  $B_{\pm} \rightarrow K_{\pm} l^{+} l^{-}$  and  $B_{\pm} \rightarrow \pi_{\pm} l^{+} l^{-}$  to probe (non-local) four-quark operator matrix element contributions to rare semileptonic B meson decays. We also explore how their effects could be in principle disentangled from possible local new physics effects. We construct a ratio of CP-odd decay rate differences which are exactly predicted within the standard model in the U-spin limit. Our results motivate binned measurements of the direct CP asymmetry in  $B_{\pm} \rightarrow \pi_{\pm} l^{+} l^{-}$  as well as dedicated theoretical estimates of U-spin breaking both in local form factors as well as in four-quark matrix elements.

For  $B \rightarrow K \mu \mu$  we show that possible NP phase in  $C_9$  Wilson coefficient can be tested by measuring the direct CP-asymmetry. We show that this asymmetry is enhanced around the peak of each  $c\bar{c}$ -resonance, and in fact more pronounced in the close vicinity of  $J/\psi$  and  $\psi(2S)$ . Therefore, measuring ACP below and above the resonances' peak could be revelatory of the CP-violation that originates from beyond the Standard Model, or to be a significant constrain when building a realistic scenario of New Physics.

**Primary author:** Dr KOŠNIK, Nejc (Jožef Stefan Institute and University of Ljubljana)

**Presenter:** Dr KOŠNIK, Nejc (Jožef Stefan Institute and University of Ljubljana)

**Session Classification:** Day 2